DOCUMENT RESUME

ED 046 859 SO 000 671

AUTHOR Murray, C. Kenneth; Williams, Tony L.
TITLE The Effect of Cognitive Instruction on Secondary Social Studies Student Teachers and Their Pupils.
INSTITUTION National Council for the Social Studies, Washington, D.C.
PUB DATE Nov 70
NOTE 14p.; Paper presented at the Annual Convention, National Council for the Social Studies, New York, New York, November 1970

EDRS PRICE EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS Behavioral Science Research, Classroom Research, *Cognitive Measurement, Cognitive Objectives, *Cognitive Processes, *Interaction Process Analysis, Preservice Education, Secondary School Students, Social Studies, *Student Behavior, Student Teachers, *Teacher Behavior, Teacher Education
IDENTIFIERS *Florida Taxonomy of Cognitive Behavior

ABSTRACT

The expanding complexities of American society and the demands placed upon educating American youth are causing the trainers of teachers to give increasing attention to developing innovative methods for improving teacher education. Since there is a lack of information concerning cognitive processes in the classroom and the effects of cognitive instruction with pre-service students in teacher education programs, this study concerned itself with these issues. Stated in the null form the hypotheses tested in this investigation were: (1) There will be no difference between the observed cognitive behavior of student teachers trained in cognitive instruction and those not so trained; and, (2) There will be no difference between the observed cognitive behavior of the pupils of student teachers trained in cognitive instruction and the pupils of those student teachers not so trained. A total of thirty-three subjects, an experimental group of seventeen and a control group of sixteen, were randomly drawn from a stratified sample and controlled on age, sex, and grade point average. Cognitive instruction was provided for the experimental group. Both hypotheses were rejected at the .001 level of significance. It seems appropriate to conclude that cognitive instruction can increase cognitive behavior in the classroom. (Author/SLD)

ED046859

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THE EFFECT OF COGNITIVE INSTRUCTION ON SECONDARY SOCIAL STUDIES STUDENT TEACHERS AND THEIR PUPILS

C. Kenneth Murray
West Virginia University

Tony L. Williams
Marshall University

A paper read at the annual meeting of the National Council for the Social Studies, New York, November, 1970.

SP 000 671

THE EFFECT OF COGNITIVE INSTRUCTION ON SECONDARY SOCIAL STUDIES STUDENT TEACHERS AND THEIR PUPILS

Introduction

The expanding complexities of American society and the demands placed upon educating American youth are causing the trainers of teachers to give increasing attention to developing innovative methods for improving teacher education. During the last two decades, a number of innovations have been developed and disseminated for use in teacher training in hopes of improving the effectiveness of classroom instruction. Some of these innovative methods are systematic classroom observation (Murray 1970), simulation experiences (Bond 1965, Broadbent and Cruickshank 1969), micro-teaching (Allen 1967, Olivero 1970), and the emphasis upon the cognition level of the teaching-learning situation (Bloom, et. al. 1956, Brown, Ober, and Soar 1967).

Social Studies specialists (Jarolimek 1962, Fenton 1966) and general educational theorists (Webb 1969) alike speak disparagingly about focusing exclusively upon lower levels of cognitive behavior in the classroom. Many of the same specialists and theorists suggest that if teachers will only move up the cognitive hierarchy (i.e., to analysis, synthesis, and evaluation), student level cognition will move up similarly.

Since there is a lack of information concerning (1) cognitive processes in the classroom and (2) the effects of cognitive instruction with pre-service students in teacher education programs, this study concerned itself with these issues. Therefore, the research was conducted in order to determine the effect of cognitive instruction in the classroom cognitive level of secondary social studies student teachers and their pupils.

Hypotheses

Stated in the null form the hypotheses tested in this investigation were:

Hypothesis 1 There will be no difference between the observed cognitive behavior of student teachers trained in cognitive instruction and those not so trained.

H1a There will be no difference between the two groups of student teachers in using the cognitive level of knowledge of specifics.

H1b There will be no difference between the two groups of student teachers in using the cognitive level of knowledge of dealing with specifics.

H1c There will be no differences between the two groups of student teachers in using the cognitive level of knowledge of universals.

H1d There will be no difference between the two groups of student teachers in using the cognitive level of translation.

H1e There will be no difference between the two groups of student teachers in using the cognitive level of interpretation.

H1f There will be no difference between the two groups of student teachers in using the cognitive level of application.

H1g There will be no difference between the two groups of student teachers in using the cognitive level of analysis.

H1h There will be no difference between the two groups of student teachers in using the cognitive level of synthesis.

H1i There will be no difference between the two groups of student teachers in using the cognitive level of evaluation.

Hypothesis 2 There will be no difference between the observed cognitive behavior of the pupils of student teachers trained in cognitive instruction and the pupils of those student teachers not so trained.

H2a There will be no difference between the two groups of pupils of student teachers in using the cognitive level of knowledge of specifics.

H2b There will be no difference between the two groups of pupils of student teachers in using the cognitive level of knowledge of dealing with specifics.

H2c There will be no difference between the two groups of pupils of student teachers in using the cognitive level of knowledge of universals.

H2d There will be no difference between the two groups of pupils of student teachers in using the cognitive level of translation.

H2e There will be no difference between the two groups of pupils of student teachers in using the cognitive level of interpretation.

H2f There will be no difference between the two groups of pupils of student teachers in using the cognitive level of applications.

H2g There will be no difference between the two groups of pupils of student teachers in using the cognitive level of analysis.

H2h There will be no difference between the two groups of pupils of student teachers in using the cognitive level of synthesis.

H2i There will be no difference between the two groups of pupils of student teachers in using the cognitive level of evaluation.

Procedure

A total of 33 subjects, an experimental group of 17 and a control group of 16, were randomly drawn from a stratified sample and controlled on age, sex, and grade point average. The experimental treatment was conducted during the week prior to the beginning of the student teaching experience. During that week one of the researchers provided cognitive instruction for the experimental group. The

treatment consisted of:

1. Providing each subject a condensed handout of Bloom's Taxonomy of Cognitive Behavior (1956). The handout was followed by a general session of lecture, discussion, questions, and answers related to the handout.

2. The second session consisted of stating behavioral objectives at the various levels of the cognitive domain. This included a discussion and handout of the work of Mager (1962) and examples and comments for constructing instructional objectives. The class was divided into small work groups where each student stated at least five objectives at each cognitive level.

3. The third experimental session was developing classroom questions and formulating test questions at various levels of the cognitive domain. This included a handout of the Gallagher-Aschner (1963) classification of questions and a discussion of the work of Sanders (1966) on classroom questions.

4. The final phase of the instruction was in the form of each student simulating a teaching lesson using peers as subjects. In this simulation each student stated instructional objectives at various cognitive levels and taught for them. Feedback was provided to each participant.

The variable that was dependent in this study was cognitive behavior in the classroom as measured by the Florida Taxonomy of Cognitive Behavior (FTCB). The FTCB (see attached copy) is an observational instrument consisting of fifty-five items which describe cognitive behavior that can be evidenced by both pupils and teachers in classroom situations. It is the task of an observer to identify and record these behaviors as they occur within specified time periods. There are five separate six-minute recording periods in each thirty-minute observation. The observer records behavior as it occurs, checking each item of teacher behavior and student behavior in the appropriate column as it happens. Items which describe behaviors that did not occur or for which a discrimination cannot be made are left unmarked. A particular item is marked only once in a given six-minute period, no matter how often that specific

behavior occurs. If a behavior is represented by more than one item, all items that are involved are checked. If a behavior does not fit into the framework of the instrument it is ignored. At the end of the thirty-minute period, the recorded teacher behaviors and pupil behaviors are tallied to produce a record of the cognitive activities which have taken place during the observation.

All cognitive behavior data describing the dependent variables were collected by five trained observers who had previously received special training in the use of the FTCB. Inter-observer reliabilities were above .80. Five observations were made for each student teacher in the experiment for data collection purposes during the course of the student teaching experience.

The collected data were then used to test the stated hypotheses. A test was employed to test the differences between the means of the experimental and control groups.

Results

In regard to hypothesis one, concerning differences between the cognitive behaviors of the experimental and control group student teachers, findings reported in Table I show that the t ratio of 5.50 rejects the null hypothesis at the .001 level of significance.

TABLE I

T TEST CONTRASTING THE COGNITIVE BEHAVIOR
OF THE EXPERIMENTAL AND CONTROL GROUP SUBJECTS

Group	Number	X	t-ratio	Significance
Experimental	17	4.851	5.50	.001
Control	16	1.989		

Hypothesis two sought to determine if there was any difference between the cognitive behaviors utilized by pupils of the experimental and control group student teachers. Statistical analysis of hypothesis two, reported in Table II, indicates that the t-ratio of 3.74 also rejects the null hypothesis at the .001 level of significance.

TABLE II

T TEST CONTRASTING THE COGNITIVE BEHAVIOR
OF THE PUPILS OF THE EXPERIMENTAL AND CONTROL GROUP SUBJECTS

Group	Number	X	t-ratio	Significance
Experimental	17	3.549	3.74	.001
Control	16	2.201		

Table III presents statistical comparison of the two groups of student teachers at nine levels of cognition. Examination of the data reveals no statistical significance between the two groups at the four lower cognitive levels. At the five higher cognitive levels the data revealed statistical significance at the .001 level of significance.

TABLE III

T TESTS CONTRASTING THE EXPERIMENTAL AND CONTROL GROUPS AT NINE COGNITIVE LEVELS

VARIABLE	MEAN SCORE EXPERIMENTAL	CONTROL	t ratio	Significance
Knowledge of Specifics	4.103	5.221	-1.248	NS
Dealing with Specifics	1.987	1.155	0.837	NS
Knowledge of Universals and Abstractions	0.883	0.632	1.348	NS
Translation	2.056	1.737	1.654	NS
Interpretation	5.113	2.323	3.801	.001
Application	3.156	0.989	4.829	.001
Analysis	9.182	2.122	7.006	.001
Synthesis	11.194	2.147	7.351	.001
Evaluation	9.347	2.506	6.733	.001

Table IV presents the results of a series of t tests contrasting the pupils of the experimental and control subjects at nine cognitive levels. No significant differences were found at the cognitive levels of dealing with specifics, knowledge of universals and abstractions, translation, and application. Significant differences were found at the following cognitive levels: knowledge of specifics (.02), interpretation (.05), and at the three higher cognitive levels of analysis, synthesis, and evaluation (.001).

TABLE IV

T TESTS CONTRASTING THE PUPILS OF THE EXPERIMENTAL AND CONTROL GROUP SUBJECTS AT NINE COGNITIVE LEVELS

VARIABLE	MEAN SCORE EXPERIMENTAL	CONTROL	t ration	Significance
Knowledge of Specifics	2.789	5.513	-2.593	.02
Dealing with Specifics	1.086	1.266	-0.638	NS
Knowledge of Universals and Abstractions	0,715	0.689	0.071	NS
Translation	1.863	1.721	0.289	NS
Interpretation	4.731	2.387	2.069	.05
Application	2.156	1.239	1.284	NS
Analysis	7.402	2.415	4.169	.001
Synthesis	7.897	3.362	3.862	.001
Evaluation	5.477	2.267	3.787	.001

Conslusions

In view of the results, it seems appropriate to conclude that cognitive instruction with pre-service secondary social studies student teachers can indeed increase their cognitive behavior in classroom instruction. The findings further indicate that if a teacher will increase the cognitive structure of his instruction the cognitive behavior of his pupils will similarly increase.

Further analysis of the data revealed little statistical significance between the experimental and control groups, and between the pupils of these two groups of student teachers, at the lower cognitive levels. Statistical significance was consistently found between the experimental and control groups, and between the pupils of these two groups, at the higher cognitive levels. This finding indicates a classroom climate involving higher aspects of cognitive behavior for the experimental group subjects and their pupils. Therefore, the data support the research hypotheses that pre-service cognitive instruction can indeed facilitate higher aspects of cognitive behavior in the classrooms of secondary social studies student teachers.

As a final note, the study also sheds light on the problem of assessing cognition in the teaching-learning process. It has been argued that the acquisition of knowledge has dominated education, that the majority of our institutions and their teachers emphasize the acquiring of information and neglect the development of cognitive processes which are needed in dealing with knowledge. With the FTCB, it is possible to more precisely define and measure this allegation in public school classrooms, student teaching situations, and micro-teaching situations.

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FLORIDA TAXONOMY OF COGNITIVE BEHAVIOR

Directions

The Florida Taxonomy of Cognitive Behavior provides a framework for observing and recording the cognitive behavior of the teacher and students in a classroom. Your role as an observer is to watch and listen for signs of the behavior described and to record the behavior as it occurs.

There are five (5) separate 6-minute observation and marking periods in each 30-minute visit to the classroom. These are indicated by the column headings I, II, III, IV, and V. During period I, as you observe the behavior of the teacher and students, go down the list of items and place a check (✓) in the T column (teacher behavior) and/or P column (pupil behavior) beside all items you saw occur. Leave blank all the items that did not occur or for which you cannot make a discrimination. A particular item is marked only once in a given column, no matter how many times that behavior occurs within the 6-minute observation period.

Repeat this process for the second 6-minute period, marking in Column II. Repeat again for the third, fourth, and fifth 6-minute periods, marking in Columns III, IV, and V. Please add the total number of (✓) recorded in Columns I through V for each teacher or pupil behavior and record in the columns headed TOT. There may be from 0 to 5✓'s for each item.

_____
Name of Teacher

_____
Date

_____
School

_____
Name of Observer

_____
Grade & Subject

TOT T	P	T/ P	T/ P	T/ P	T/ P	T/ P	3.00 Interpretation
							24. Gives reason (tells why)
							25. Shows similarities, diffrncs
							26. Summarizes or concludes frm obs of evdnce
							27. Shows cause and effect ritnshp
							28. Gives analogy, simile, metaphor
							29. Performs a directed task or process

4.00 Application

						30. Applies previous learning to new sitn
						31. Applies principle to new situation
						32. Apply abstrct knldg in a prctcl sitn
						33. Idntifs, selects, and carries out process

5.00 Analysis

						34. Distngshs fact from opinion
						35. Distngshs fact from hypothesis
						36. Distngshs cnclsn frm stmnts wch suppt it
						37. Points out unstated assumption
						38. Shows interaction or relation of elements
						39. Points out prticlrs to jstfy cnclsn
						40. Checks hypthss with given info
						41. Dstngshs rel frm irrelvnt stmnts
						42. Detects error in thinking
						43. Infers prpse, pt of view, thghts, feeling
						44. Recog bias or propaganda

6.00 Synthesis (Creativity)

						45. Reorganizes ideas, materials, process
						46. Produces unique cmmnctn, divergent idea
						47. Produces a plan, prpsd set of oprtns
						48. Designs an apparatus
						49. Designs a structure
						50. Devises scheme for classifying info
						51. Formulates hypothesis, intelligent guess
						52. Mks dedctns frm abstrct smbls, propostns
						53. Draws inductive generalizatn frm specifcs

7.00 Evaluation

						54. Evaluates something from evdnce
						55. Evaluated something from criteria

FLORIDA TAXONOMY OF COGNITIVE BEHAVIOR

TOT T	TOT P	T/ P	T/ P	T/ P	T/ P	T/ P	1.10 Knowledge of Specifics
							1. Reads
							2. Spells
							3. Identifies something by name
							4. Defines meaning of term
							5. Gives a specific fact
							6. Tells about an event

1.20 Knowledge of Ways and Means of Dealing With Specifics

						7. Recognizes symbol
						8. Cites rule
						9. Gives chronological sequence
						10. Gives steps of process, describes method
						11. Cites trend
						12. Names classification system or standard
						13. Names what fits given system or standard

1.30 Knowledge of Universals and Abstractions

						14. States generalized concept or idea
						15. States a principle, law, theory
						16. Tells about orgaztn or structure
						17. Recalls name of prin, law, theory

2.00 Translation

						18. Restates in own words or briefer terms
						19. Gives cncrt exmpl of an abstract idea
						20. Verbalizes from a graphic rprsntatn
						21. Trans vrbiztn into graphic form
						22. Trans fig stmnts to lit stmnts, or vice v
						23. Trans for lang to Eng, or vice versa